

***TETRIX SUBULATA* L., SLENDER GROUND-HOPPER  
(ORTH.: TETRIGIDAE) IN NORTH LANCASHIRE, VC60**

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ON 26 APRIL 1987, one adult ground-hopper was found swimming in a ditch on Silverdale Moss, grid reference SD474774, a remnant of fen vegetation on the edge of a largely drained and reclaimed moss in North Lancashire, close to the border with Cumbria. Although the pronotum of the specimen barely reached the tips of the hind femora, the hindwings projected just beyond the pronotum. It was finally identified by Judith Marshall as the short-winged form *bifasciata* (Herbst) of *Tetrix subulata* (L.) and is now held at the British Museum (Natural History).

Further searches turned up no more specimens of *T. subulata*, either here or on other mosses in the area (although *T. undulata* Sowerby is known from a number of sites nearby). In 1992 Hawes Water Moss, SD4776 about a kilometre to the south of Silverdale Moss, was acquired by English Nature as an extension to the Gait Barrows National Nature Reserve. This moss, lying to the south of Hawes Water tarn, comprised an area of very wet fen peat, largely under alder-willow carr *Alnus glutinosa* and *Salix cinerea* with some reed-bed *Phragmites australis*. In the winter of 1994-95, a great deal of the alder and willow was coppiced.

In 1995 a Malaise trap was set up on the western edge of the moss at SD474764, just east of the main dyke and a fringing alder woodland. The trap was in place from 13 April to mid-December, with samples removed on six occasions, 26 June, 10 July, 27 July, 16 August, 16 September and mid-December. The first three samples contained no Orthoptera, but on 16 August there was one male and one female *T. subulata*, on 16 September there were 19 males and 15 females of *T. subulata*, one male *T. undulata* and two *Tetrix* nymphs, while in mid-December there were two male and one female *T. subulata*. All 39 adult *T. subulata* were of the *bifasciata* form, separable from *T. undulata* by the hindwings protruding just beyond the tip of the pronotum and the much less pronounced crest to the pronotum, which also lacks the dorsal arching of *T. undulata*. Without careful examination they could easily be passed over as *T. undulata*. Voucher specimens are held at Liverpool Museum (National Museums and Galleries on Merseyside) and Tullie House Museum, Carlisle.

In 1996 no Orthoptera were found on visits to the site on 24 April and 6 May. On 16 August, in addition to *Chorthippus brunneus* Thunberg, there were a number of *Tetrix* nymphs and one adult *T. subulata*. On 14 September the first and only typical, long-winged specimen was found (a male), in addition to six f. *bifasciata* (three males and three females). All specimens were found in open areas where the ground was either moss-

covered or bare peat by open water. In the mossy areas there were small scattered shoots of cyperus sedge *Carex pseudocyperus* and greater tussock-sedge *C. paniculata*, yellow flag *Iris pseudacorus*, common reed *Phragmites australis* and creeping bent *Agrostis stolonifera*. These open areas occupy a fairly small proportion of the whole, where bulky sedges, grasses and herbs such as watermint *Mentha aquatica*, gipsywort *Lycopus europaeus*, greater skullcap *Scutellaria galericulata* and meadow-sweet *Filipendula ulmaria* mostly form a closed canopy. *Salix cinerea* and *Alnus glutinosa* are regrowing vigorously. The long-term aim is, however, to manage the site for fen and reed-bed.

It is interesting that so many *Tetrix* specimens were caught in a Malaise trap, and no *C. brunneus*, although *C. brunneus* was plentiful at the site on 16 August 1996. Haes (*pers. comm.*) has observed that in Cornwall *T. subulata* moves from very wet sites in early autumn to overwinter in drier sites. Adult *C. brunneus* presumably die on the site.

These records of *T. subulata* from Silverdale and Hawes Water Mosses are the most northerly so far from Britain, although it has been found further north in Ireland. Last century it was known from Thorne Moors, VC63, previously its most northerly known locality, and in 1983 it was found by the Dee near Overton, Clwyd, VC50 (Marshall and Haes, 1988). Since 1988 there have been records from VCs 54 (N. Lincolnshire, update to a pre-1960 record), 56 (Nottinghamshire), and 57 (Derbyshire) (Haes, 1991).

Gait Burrows NNR stands out as an exceptional site for Orthoptera in the north of England, with six species. The limestone pavement and associated scrub and woodland carry *Myrmeleotettix maculatus* (Thunberg), *Chorthippus brunneus*, *Omocestus viridulus* (L.) and *Tetrix undulata*. *Chorthippus parallelus* (Zetterstedt) and *O. viridulus* flourish in the black bog-rush *Schoenus nigricans* and small sedge mire at the edge of Hawes Water, while the two *Tetrix* species occur on Hawes Water Moss with *C. brunneus*. Close by, on Arnside Knott in Cumbria, the bush crickets *Pholidoptera griseoaptera* (De Geer) and *Meconema thalassinum* (De Geer) replace *C. parallelus* and *T. subulata* to bring this site's total to six species and the total for grid square SD47 to eight.

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#### References

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